IN THE CLAIMS

Please cancel, without prejudice, claims 1-77 and append new claims 225-295:

225) A prime mover output control system, comprising

a) a prime mover, comprising a mechanical output comprising a rotational velocity and a torque, and

b) a generator, powered by said prime mover, comprising an adjustable torque load on said prime mover, wherein said torque load having an effect on said rotational velocity of said prime mover, and

c) a control mechanism connected to said generator, comprising an input for signaling a system power output requirement, said control mechanism comprising control over said adjustable torque load of said generator, to effect a product of prime mover rotational velocity and torque to substantially meet said system power output requirement.

226) The system of claim 225 wherein said control over said adjustable torque load, comprising a torque load decrease in response to a requirement of a system power output increase, and a torque load increase in response to a requirement for a system power output decrease.

227) The system of claim 225 wherein said control mechanism further comprising graphical or mechanical techniques for use in determining said torque load.

228) The system of claim 227 wherein said control over said adjustable torque load comprising adjustment of said torque load in response to a changed system power output requirement, in a single adjustment step.

229) The system of claim 228 wherein said generator supplying power to an eventual recipient, and wherein said control mechanism comprising an energy storage unit, said energy storage unit for supplying said eventual recipient with said system power output requirement, substantially irrespective of prime mover output fluctuations caused by prime mover power output change.

230) The system of claim 228 wherein said generator supplying electricity to an eventual recipient, and wherein said control mechanism not comprising substantial electricity

storage, whereby the eventual recipient receives power of a somewhat fluctuating nature during periods of power output change.

229
231) The system of claim 228 wherein said control over said adjustable torque load comprising adjustment of said torque load in response to a changed system power output requirement, in a set of multiple adjustment steps.

230
232) The system of claim 227 wherein said generator having dynamically unstable equilibrium with said mechanical output of said prime mover, and wherein said control mechanism further comprising means to accomplish a secondary step of adjusting said torque load to stop said prime mover from further changes in speed, upon the attainment of said system power output requirement.

A' cont.

231
233) The system of claim 226 wherein said control mechanism comprising gearing or other speed changing apparatus between said prime mover and said generator.

Rule 1.126

232
234) The system of claim 226 wherein said control mechanism comprising an energy storage unit.

233
235) The system of claim 226 wherein said generator supplying power to an electrical load, and wherein said control mechanism comprising electronic components for the adjustment of the current drawn from the generator, to effect control over the torque load of the generator.

234
236) The system of claim 235 wherein said electronic components comprising a power electronic load electrically connected between said generator and said electrical load, said power electronic load comprising a controllable current draw from said generator, wherein said torque load of said generator being directly related to said current draw.

235
237) The system of claim 236 wherein said generator comprising a direct current generator and wherein said controllable current draw of said power electronic load comprising a controllable relationship of current versus voltage from said generator.

236
238) The system of claim 236 wherein said generator comprising an alternating current synchronous permanent magnet machine and wherein said power electronic load comprising a control element for adjustment of said controllable current draw, based on a

desired relationship between a sampled generator output current and a sampled generator output voltage,

237
239) The system of claim 236 wherein said generator comprising an alternating current synchronous permanent magnet machine and wherein said power electronic load comprising a control element for adjustment of a frequency component of , providing said controllable current draw.

238
240) The system of claim 236 wherein said generator comprising an alternating current synchronous externally excited machine comprising fixed excitation, and wherein said input of said power electronic load from said generator comprising a controllable current versus voltage relationship comprising said controllable current draw.

239
241) The system of claim 236 wherein said generator comprising an alternating current synchronous externally excited machine having fixed excitation, and wherein said input of said power electronic load from said generator comprising a controllable frequency, providing said controllable current draw.

240
242) The system of claim 236 wherein said generator comprising an alternating current induction machine and wherein said input of said power electronic load from said generator comprising a controllable frequency, providing said controllable current draw.

241
243) The system of claim 236 wherein said power electronic load comprising an operating range, comprising positive incremental resistance over part of all of said operating range.

242
244) The system of claim 243 wherein said power electronic load having

a) a threshold voltage; below said threshold voltage, said current draw is very low or nil, and above said threshold voltage, said current draw increases steeply versus voltage,

b) a threshold voltage adjuster for controlling said threshold voltage, and thereby, said current draw from the generator.

243
245) The system of claim 244 wherein said threshold voltage adjuster further connected to said input for signaling a system power output requirement, and further comprising graphical or mathematical techniques for determining said threshold voltage in accordance with said required power output.

244

246) The system of claim 245 wherein said threshold voltage adjuster comprising means to increase said threshold voltage in response to an input signal describing a required power output increase, and means to decrease said threshold voltage in response to an input signal describing a required power output decrease.

245

247) The system of claim 238 wherein said power electronic load comprising a boost converter, said boost converter comprising an electrical input from said generator and a switching element for controlling said current draw by controlling the current versus voltage relationship of said electrical input from said generator.

Ri Cont.

246

248) The system of claim 226 wherein said mechanical load comprising a generator supplying power to an electrical load comprising variable resistance, and wherein said generator being configured to have a torque load directly related to the current draw of said electrical load from said generator and wherein said control mechanism comprising control over said variable resistance to control said torque load.

Rule 1.126

247

249) The system of claim 248 wherein said generator being a direct current machine.

248

250) The system of claim 248 wherein said generator being an alternating current machine.

249

251) The system of claim 248 wherein said variable resistance comprising one or more variable resistors.

250

252) The system of claim 251 wherein said variable resistance comprising a plurality of fixed resistance resistors, and wherein said control mechanism comprising switches for switching different resistors in and out of a circuit to provide said control over said variable resistance.

25

253) The system of claim 252 wherein said variable resistors comprising variable resistance heaters.

252

254) The system of claim 226 wherein said mechanical load comprising an electrical generator, supplying power to an electrical load, said generator comprising adjustable excitation, and wherein said generator being configured to have a torque load directly related to its excitation, and wherein said control mechanism comprising control over said adjustable excitation to control said torque load.

253
255) The system of claim 254 wherein said control mechanism comprising control over the relationship between the synchronous speed and the torque load of the generator

254
256) The system of claim 255 wherein said generator being a direct current independent wound commutated machine.

255
257) The system of claim 256 wherein said generator being a direct current independent wound brushless machine.

A' cont.

256
258) The system of claim 257 wherein said generator being a direct current permanent magnet brushless machine.

257
259) The system of claim 257 wherein said generator being an alternating current synchronous machine.

258
260) The system of claim 256 wherein said generator being an alternating current induction machine, and wherein said control mechanism comprising a quadrature current controller for varying the supply of quadrature current to the induction machine.

Claim 1, 126

259
261) The system of claim 225 wherein said mechanical load comprising:

a) a generator, and

b) a power electronic load, and

c) energy storage, and

d) an electrical load

wherein said power electronic load comprising an electrical input from said generator and being configured to control the current draw of said electrical input; thereby controlling the torque draw of the mechanical load; and wherein said energy storage connected to said power electronic load, and wherein said electrical load connected to said energy storage.

260
262) The system of claim 261 further comprising a controller having an input from said energy storage, and wherein said electrical load having an input from said controller, wherein said controller comprising control over the characteristics of the electrical input to said electrical load.

261
263) The system of claim 262, wherein said energy storage being a battery.

262

~~264)~~ The system of claim 263, wherein said generator being a direct current or a rectified alternating current generator, and wherein said battery having a higher voltage than the voltage of said input of said power electronic load from said generator and wherein said power electronic load comprising a boost converter located between said generator and said battery.

263

~~265)~~ The system of claim 264, wherein said generator being a direct current or rectified alternating current generator, and wherein said battery having a lower voltage than the voltage of said input of said power electronic load from said generator, and wherein said power electronic load comprising a buck converter connected between the generator and the battery.

264

~~266)~~ The system of claim 263 further comprising a position sensing mechanism mechanically coupled to said prime mover, for commanding said control mechanism to apply an appropriate torque load at appropriate times during cyclic variations of said prime mover to mechanically assist said prime mover.

266

~~267)~~ The system of claim 266, wherein said position sensing mechanism comprising a rotor position sensor.

266

~~268)~~ The system of claim 263, wherein said generator being a brush commutated direct current generator or a brushless direct current motor modified with suitable backdiodes so as to be capable of generator operation and wherein said power electronic load comprising

a) the capability to source power from said energy storage, and

b) said electrical input to said power electronic load comprising an input voltage and an input current, said input current being controllable by said power electronic load to have current versus said input voltage characteristics that cause the automatic transition of generator to motor action and motor to generator action, around voltages related to said input voltage to have the following characteristics:

c) a high ratio of current draw to input voltage of above said threshold voltage, and a high negative ratio of current draw to input voltage of below said threshold voltage,

whereby said generator transitions to motor action during reduced voltage periods that occur when said prime mover is engaged in substantially non power-producing periods.

267
269) The system of claim 268, wherein said power electronic load comprising a combination boost and buck converter connected between said generator and said energy storage.

268
270) The system of claim 263 wherein said power electronic load comprising current draw versus input voltage characteristics to cause a dynamic reduction of current draw from said generator during periods of reduced generator voltage.

A!

269
271) The system of claim 263 wherein said power electronic load comprising a receptor for receiving a signal to start said system, and being configured to respond to said signal with the synthesis of suitable current and voltage characteristics for the sourcing of power from said energy storage to said generator, whereby causing said generator to act as a starting motor to said prime mover.

270
272) The system of claim 271 wherein said generator being a brush commutated direct current generator.

Rule 1.136

271
273) The system of claim 271 wherein said generator being a brushless direct current motors modified with suitable backdiodes so as to be capable of generator operation.

272
274) The system of claim 271 wherein said generator being a rectified alternating current generator and wherein said power electronic load comprising an input of controllable frequency.

273
275) The system of claim 225 wherein said mechanical load comprising:

a) an electrical load, and
b) a generator for generating electricity for said electrical load, and comprising an excitation current having a frequency, and
c) energy storage, connected to an output of said generator and an input of said electrical load, and
d) a generator excitation control for controlling said excitation current of said generator to effect control over said torque load on said prime mover.

274
276) The system of claim 275wherein said generator comprising an alternating current generator capable of motor operation, and wherein said generator excitation control for controlling said frequency of said generator excitation current, and comprising a power electronic

load, connected between said generator and said energy storage, for the sourcing and sinking of power.

275
~~277)~~ The system of claim 276 wherein said generator excitation control further comprising an input for receiving a signal to start said system, and comprising a programmed response to said signal of an increase in said excitation frequency from zero, and the sourcing of suitably synthesized current from said energy storage, and a startup heat source in said prime mover, in the case that said prime mover is of the type that requires a startup heat source to begin operation.

276
~~278)~~ The system of claim 277 wherein said generator being an induction motor capable of acting as a generator, and wherein said generator excitation control comprising an inverter for synthesizing quadrature excitation current with an adjustable frequency for said generator.

277
~~279)~~ The system of claim 278 wherein said generator excitation control comprising:

a) means to source current from said energy storage to power said generator as a motor, and

b) permitting a natural generator to motor transition during cyclic power output changes of said prime mover,

whereby said generator acts as a motor during periods of substantially reduced prime mover torque output.

278
~~280)~~ The system of claim 279 wherein said prime mover does not comprise a flywheel.

279
~~281)~~ The system of claim 280 wherein said generator excitation control further comprising

a) an input for receiving a signal to start said system,

b) means to increase inverter frequency in response to said signal, and

c) a power electronic load connected between said generator and said energy storage, for causing said energy storage to supply operating power to said generator; whereby said prime mover may be started.

280
282) The system of claim 225 wherein said generator for generating alternating current and comprising electrical terminals, and wherein said control mechanism comprising:

a) a power electronic load, connected to said electrical terminals of said generator, said power electronic load comprising rectifier components, for converting alternating current to direct current, and wherein said power electronic load comprising control over the frequency of said alternating current, to effect control over said torque load of said generator on said prime mover,

b) energy storage, connected to said power electronic load, and

c) an electrical load, connected to said energy storage.

A1

281

~~283)~~ The system of claim 282 further comprising a controller electrically connected between said energy storage and said electrical load for supplying power to said electrical load at substantially the electrical requirements of said electrical load.

282

~~284)~~ The system of claim 283, wherein said energy storage being a battery.

283

~~285)~~ The system of claim 284 wherein said power electronic load comprising an inverter and a boost converter, electrically connected between said generator and said energy storage.

Rule 1.126

284

~~286)~~ The system of claim 285 further including: a position sensing mechanism mechanically coupled to said prime mover for sensing the position of said prime mover during different parts of a prime mover power cycle, and connected to said power electronic load for commanding an increase in said frequency during parts of said prime mover power cycle during which said prime mover power output is substantially low or zero.

285

~~287)~~ The system of claim 286 in which said increase in said frequency being sufficient to cause said generator to transition to motoring mode.

286

~~288)~~ The system of claim 287 wherein said generator is an induction generator.

287

~~289)~~ The system of claim 288, wherein said power electronic load comprising a current draw versus frequency characteristic being steep enough to cause a dynamic reduction of generator current draw during periods when said frequency of said electrical input of said generator is low.

288

~~290)~~ The system of claim 289 wherein said prime mover comprising a heat engine and comprising a startup heat source, and wherein said generator being capable of acting as a motor, and wherein said power electronic load being electrically connected between said electrical generator and said energy storage and comprising rectifier elements and

comprising control over the frequency of said electrical current from said energy storage to said generator to power said generator as a motor and wherein said input for signaling a system power output requirement also for signaling to start said system power output requirement from zero, said signal for commanding to start said system power output requirement from zero for commanding the powering of said generator as a motor, until a synchronous speed is reached whereby said generator may be used as a starting motor to said prime mover.

A1

289
291) The system of claim 286 wherein said power electronic load further comprising: a position sensing mechanism for commanding a the powering of said generator as a motor during time periods when said prime mover is engaged in a substantially non-power producing stroke.

Rule 1.126

290
292) The system of claim 225 further comprising energy storage and wherein said mechanical load comprising a generator, for supplying electrical power to an electrical load, , and wherein said control mechanism comprising an electrical input from said generator and being configured to control the resistance of said input to effect control over said torque load; ; and wherein said control mechanism comprising an electrical output to said energy storage.

291
293) The system of claim 292 further comprising a controller load, electrically connected between said energy storage unit, and said electrical load and having control over the conversion of electrical power from said energy storage to said electrical load to substantially the electrical requirements of said electrical load.

292
294) The system of claim 293, wherein said energy storage comprising a battery.

293
295) The system of claim 294 further comprising: a position sensing mechanism for determining non-power producing prime mover power cycle portions and for commanding said control mechanism to produce a dynamic resistance increase substantially during non-power producing prime mover power cycle portions.